

GUIDELINES AND RESOURCES FOR MANAGING SOYBEAN DISEASES

Diseases can and do cause economic losses in midsouthern soybean systems. Until the early 2000's, many diseases could only be managed with resistant varieties or with cultural practices that were marginally effective.

Fortunately, there are now preventive and/or curative management practices available for most major diseases of soybeans. The attached table lists diseases and how they can be managed, prevented, or controlled.

Several important diseases (sudden death syndrome [SDS], stem canker, *Phytophthora* root rot [PRR], charcoal rot, seed and seedling diseases) of soybeans have no curative control; i.e., these diseases may be prevented but not cured once present. SDS and stem canker can be managed or avoided by using less-susceptible or resistant varieties, or rotation to a non-host crop in a field that has a history of a problematic infestation by one of the diseases. PRR can be managed by using resistant varieties. However, PRR appears to be a relatively rare disease and typically only occurs on clay soils that hold excessive water when saturated or near-saturated.

Seed and seedling diseases (caused by numerous fungi that likely comprise a “complex” of fungi that includes but is not limited to *Cercospora*, *Fusarium*, *Phomopsis*, *Pythium*, *Phytophthora*, and *Rhizoctonia solani*) can be effectively prevented by using the proper seed-applied fungicide ([seed treatments](#)). However, this is not to suggest that they will be eliminated with the use of a properly labeled seed treatment. The environment at time of planting or shortly after planting dictates whether or not a seedling disease will occur.

There are no known resistant varieties (only moderately resistant germplasm and some tolerant varieties) or fungicides for charcoal rot management. Additionally, it is likely that the

majority of germinating seed are infected with the causal organism *Macrophomina phaseolina* shortly after the cotyledon emerges from the planted seed. Charcoal rot will manifest itself in infected plants if and when a condition such as drought or poor irrigation management causes stress to plants. Thus, it is the disease that is presently considered the most problematic.

Foliar fungicides can be applied to prevent several prominent soybean diseases. Preventive fungicides (i.e. strobilurins [QoIs] such as azoxystrobin [Quadris] or pyraclostrobin [Headline]) are most effective when applied prior to or at the earliest appearance of a disease.

The general suggestion is that the first application should be made at R3 or beginning of podset. Fungicide application during early reproductive development to prevent foliar diseases in soybeans has been proven over the past decade to be an economical management practice in the midsouthern US.

Soybean rust can be managed with preventive and curative (i.e. triazole [demethylation inhibitors (DMI)] such as flutriafol [Topguard] or tetraconazole [Domark]) applications of foliar fungicides timed according to occurrence of rust in sentinel plots. Based on the last five years' experience, soybean rust may be avoided in the Midsouth by planting early-maturing varieties early so that R6 or full seed stage is reached before August 1. Additionally, the R3/R4 fungicide application utilized in Midsouth production systems has likely provided some prevention of soybean rust in areas where the disease has occurred.

Scouting should be used to detect the first occurrence of disease(s) or to accurately determine the [reproductive stage](#) recommended for the most effective preventive fungicide application prior to

disease presence.

Cost and effectiveness of fungicide products should be evaluated when choosing options for disease management. Resistant varieties should be chosen based on level of pest tolerance and yield and grown in those areas with a known history of a particular disease (e.g. frog-eye leaf spot [FLS]).

Information in **Table 1** provides a summary of the important points for managing prominent diseases. In the table:

- Click the varietal resistance heading to find the most recent ratings of resistance published in midsouthern states' variety trial publications. Varietal resistance is the most widely used and effective management tool for soybean diseases.
- Click the foliar fungicide heading to get 2015 recommendations from the University of Arkansas. Also, a 2015 [University of Missouri](#) publication (p. 134-149) gives foliar fungicide suggestions with a very detailed description of application guidelines.

A recent survey indicated that losses to the diseases presented in the below table are significant in most years. However, some portion of the losses to these diseases can be prevented every year if available controls are used. Keep in mind that the manifestation of plant diseases will be most dependent on the environment that is encountered each growing season as well as the over-wintering potential for organisms such as the soybean rust fungus that has to blow into the Mississippi soybean production area from more southern locations each year.

To better assist in selecting foliar fungicides for control of the above diseases, the North Central Regional Committee on Soybean Diseases and the Regional Committee for Soybean Rust Pathology developed information about [foliar fungicide efficacy for control of major foliar soybean diseases](#) in

the United States. Results from that compilation are in **Table 2**.

Specific [considerations for soybean fungicide management](#) are:

- An R3/R4 strobilurin or strobilurin + triazole fungicide application is made at that time regardless of the presence of disease. It produces best results when applied in a potentially high-yielding soybean crop (e.g. early planted, irrigated soybean following soybean).
- Applying a product that contains a stand-alone triazole should be delayed until foliar disease is present. They should be relied on for managing against yield loss as a result of FLS or soybean rust infestations.
- Fungicides in the strobilurin class are best suited for when diseases are not present; i.e., used on a preventive basis. The residual effect in this case should be about 21 days.
- Even though triazole fungicides have the ability of being curative and can be applied to manage a present disease, they perform best when applied prior to the onset of visible disease symptoms. Their residual effect generally lasts about 14 days.
- The systemic activity of both strobilurin and triazole fungicides is limited to movement around the area of the leaf where a spray droplet is deposited. Fungicides in both classes should not be considered to move throughout the plant from the point of entry.
- Growing varieties that are susceptible to FLS may increase the likelihood of developing fungicide-resistant FLS biotypes.
- If an FLS-tolerant/resistant variety is grown, relying on a stand-alone strobilurin fungicide is an acceptable practice to manage other diseases or as an automatic fungicide application.

- If an FLS-susceptible variety is grown and FLS has been detected, applying a labeled triazole fungicide could reduce yield loss.
- With the onset of strobilurin-resistant FLS, triazoles should be considered to manage the disease.

Table 1. Major midsouthern soybean diseases and potential methods of prevention.

Disease	Varietal resistance	Foliar Fungicide	Additional information
Anthracnose	No	Yes	Use seed treatment to reduce damping off
Soybean rust	Yes	Yes	Resistant germplasm has been identified; however, there are presently only two commercially-available soybean varieties
Cercospora leaf blight, purple seed stain	No	Yes	Use seed treatment to reduce early-season damping off from infested seed and foliar fungicide for some late-season prevention
Charcoal rot	No	No	Prevent/reduce plant stress; some tolerant varieties may be commercially available
Frogeye leaf spot (FLS)	Yes	Yes	Resistance to strobilurin fungicides has been identified; rotate fungicide chemistries and apply mixed mode of action products to susceptible varieties; plant resistant varieties
Phytophthora root rot	Yes	No	Use seed treatment (early season)
Phomopsis seed decay	No	Yes	Use seed treatment to prevent early-season seedling disease as a result of <i>Phomopsis</i> -infested seed
Pod and stem blight	Yes	Yes	Fungicides, although labeled, may not be as effective
Pythium seed decay, damping off	No	No	Use seed treatment
Aerial blight	No	Yes	Use less-susceptible varieties if available
Stem canker	Yes	No	Varietal resistance is effective
Sudden death syndrome	Yes	No	Use less-susceptible varieties; monitor for the presence of soybean cyst nematode (SCN)

Table 2. Fungicide efficacy for soybean disease management. NR = not recommended; NL = not labeled; P = poor; F = fair; G = good; VG = very good; E = excellent.

Product	Rate/acre (fl oz)	Aerial web blight	Anthracnose	Cercospora leaf blight	Frogeye leaf spot	Pod/stem blight	Soybean rust	PHI*
Strobilurins-QoI (Group 11)								
Aftershock 480 SC	2.0-5.7	VG	G	**	P	**	**	R5
Approach 2.08 SC	6.0-12.0	VG	G	F	P	**	G	14 days
Evito 480 SC	2.0-5.7	VG	G	F	P	**	**	R5
Headline 2.09 EC/SC	6.0-12.0	VG	VG	F	P	**	G-VG	21 days
Quadris 2.08 SC	6.0-15.5	VG	VG	F	P	**	G-VG	21 days
Triazoles-DMI (Group 3)								
Alto 100SL	2.75-5.5	**	**	F	F	**	VG	30 days
Domark 230 ME	4.0-5.0	NL	VG	F	VG	**	VG-E	R5
Proline 480 SC	2.5-3.0	NL	NL	NL	VG	NL	VG	21 days
Tilt 3.6 EC	2.0-4.0	P	VG	F	VG	**	VG	R5
Topguard 1.04 SC	7.0-14.0	**	VG	F	VG	**	E	21 days
Thiophanates-MBCs (Group 1)								
Topsin-M	10.0-20.0	---	---	F	VG	---	G	21 days
Premixes (Mixed Mode of Action)								
Avaris 1.66 SC	14.0-20.5	**	**	**	G	**	VG	21 days
Evito T 3.99 F	4.0-6.0	**	F	**	F	**	**	30 days
Priaxor 4.17 SC	4.0-8.0	E	VG	F	VG	**	E	21 days
Priaxor D (A + B) ***	4(A)+4(B)	**	**	F	VG	**	**	21 days
Quadris Top 2.72 SC	8.0-14.0	**	**	F	VG	**	VG	14 days
Quilt 1.66 SC	14.0-20.5	**	**	F	G	**	VG	21 days
Quilt Xcel 2.2 SE	10.5-21.0	E	VG	F	VG	**	VG	R6
Stratego 250 EC	10.0	G-VG	VG	F	VG	**	VG	21 days
Stratego YLD 4.18 SC	4.0-4.65	VG	VG	F	VG	**	VG	21 days

*PHI = pre-harvest interval in days, or no later than shown R stage.

**Insufficient data for efficacy statement.

***Priaxor D is a combination product offered by BASF that includes: Component A = Priaxor and Component B = Domark. One case of Priaxor D contains a 2.5-gal. jug each of Priaxor and Domark. Labels for above fungicides can be found on the Crop Data Management Systems [Labels/MSDS](#) page or at Agrian's [Labels/MSDS](#) page.

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